

**SYNTHESIS, CHARACTERIZATION AND CATALYTIC
ACTIVITY OF PALLADIUM(II)-1,3-BIS(PHENYLMETHYL)
BENZIMIDAZOLIUM BROMIDE IN HECK REACTION**

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**Final Year Project Report Submitted in
Partial Fulfilment of The Requirements for the
Degree of Bachelor of Sciences (Hons.) Chemistry
in The Faculty of Applied Sciences
Universiti Teknologi MARA**

JULY 2017

This Final Year Project Report entitled “**Synthesis, Characterization and Catalytic Activity of Palladium(II)-1,3-bis(phenylmethyl) Benzimidazolium Bromide in Heck Reaction**” was submitted by Mohamad Azamuddin bin Mustakim, in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Chemistry, in the Faculty of Applied Sciences, and was approved by



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Date: 7/8/2017

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ABSTRACT

SYNTHESIS, CHARACTERIZATION AND CATALYTIC ACTIVITY OF PALLADIUM(II)-1,3-BIS(PHENYLMETHYL) BENZIMIDAZOLIUM BROMIDE IN HECK REACTION

Palladium is used as a catalyst for carbon-carbon coupling such as in Heck, Stille and Suzuki reaction. This research reports on a palladium catalyst for Heck reaction namely palladium(II)-1,3-bis(phenylmethyl) benzimidazolium bromide. The *N*-heterocyclic carbene (NHC) ligand was prepared by reacting benzyl bromide with benzimidazole while the palladium catalyst was prepared by reacting palladium chloride with the synthesized NHC ligand. The palladium catalyst has been successfully synthesized and characterized by using Fourier transform infrared (FTIR), ^1H and ^{13}C nuclear magnetic resonance (NMR), UV-Vis spectroscopy and CHNS elemental analysis. FTIR spectra confirm the present of important group in the synthesized complex such as C=N group. NMR and CHNS elemental analysis results also supported in the confirmation of the complex structure. UV-Vis spectroscopy results showed the absorption maxima of Pd^{2+} cation and NHC ligand. The blue shifting in UV-Vis spectra for palladium catalyst give an evidence of the successfulness of the complexation. The preliminary complexation between Pd^{2+} cation and *N*-heterocyclic carbene (NHC) ligand shows stoichiometric of 1 Pd^{2+} cation to 2 NHC ligand. The catalytic activity of the palladium catalyst was studied on Heck carbon-carbon coupling reaction between 1-bromo-4-nitrobenzene and styrene. Two parameters of the reaction were studied which are different catalyst loading and effect of different reaction time. The results show that excellent catalytic activity is achieved using catalyst loading of 0.5 mmol % and 60 minutes of reaction time.